1217048

THE UNITED STATES OF AMERICA

TO ALL TO WHOM THESE PRESENTS SHALL COME:

UNITED STATES DEPARTMENT OF COMMERCE

United States Patent and Trademark Office

August 25, 2004

THIS IS TO CERTIFY THAT ANNEXED HERETO IS A TRUE COPY FROM THE RECORDS OF THE UNITED STATES PATENT AND TRADEMARK OFFICE OF THOSE PAPERS OF THE BELOW IDENTIFIED PATENT APPLICATION THAT MET THE REQUIREMENTS TO BE GRANTED A FILING DATE.

APPLICATION NUMBER: *60/491,887*
FILING DATE: *August 01, 2003*
RELATED PCT APPLICATION NUMBER: *PCT/US04/24993*

Certified by

Jon W Dudas

Acting Under Secretary of Commerce
for Intellectual Property
and Acting Director of the U.S.
Patent and Trademark Office

PTO/SB/16 (06-03)
Approved for use through 07/31/2003. OMB 0651-0032
U.S. Patent and Trademark Office; U.S. DEPARTMENT OF COMMERCE

PROVISIONAL APPLICATION FOR PATENT COVER SHEET

This is a request for filing a PROVISIONAL APPLICATION FOR PATENT under 37 CFR 1.53(c).

Express Mail Label No. EL738855184US

INVENTOR(S)

Given Name (first and middle [if any])	Family Name or Surname	Residence (City and either State or Foreign Country)
Shriram Shivanand	Pathak	Farmington, Michigan 48335
Frederick Michael	Kosinski	Royal Oak, Michigan 48073
Stephen	Tokarz	New Boston, Michigan 48164

☐ *Additional inventors are being named on the ____ separately numbered sheets attached hereto*

TITLE OF THE INVENTION (500 characters max)

VEHICLE SEAT ASSEMBLY AND FLOOR RAIL FOR LATERAL SEAT SHUTTLING

Direct all correspondence to: **CORRESPONDENCE ADDRESS**

☒ Customer Number 28886

OR

☒ Firm or Individual Name	Kevin S. MacKenzie				
Address	Clark Hill PLC				
Address	500 Woodward Avenue, Suite 3500				
City	Detroit	State	MI	ZIP	48226-3435
Country	US	Telephone	(313) 965-8300	Fax	(313) 965-8252

ENCLOSED APPLICATION PARTS *(check all that apply)*

☒ Specification *Number of Pages* 12 ☐ CD(s), Number

☒ Drawing(s) *Number of Sheets* 9 ☒ Other (specify) Certificate of Express Mail; Return Postcard

☐ Application Data Sheet. See 37 CFR 1.76

METHOD OF PAYMENT OF FILING FEES FOR THIS PROVISIONAL APPLICATION FOR PATENT

☐ Applicant claims small entity status. See 37 CFR 1.27.

☐ A check or money order is enclosed to cover the filing fees

☒ The Director is hereby authorized to charge filing fees or credit any overpayment to Deposit Account Number 50-1759

☒ Payment by credit card. Form PTO-2038 is attached.

FILING FEE AMOUNT ($) $160.00

The PTO did not receive the following listed item(s) Credit Card

The invention was made by an agency of the United States Government or under a contract with an agency of the United States Government.

☒ No.

☐ Yes, the name of the U.S. Government agency and the Government contract number are: _____

Respectfully submitted,

SIGNATURE _____ Date 08/01/2003

TYPED or PRINTED NAME Kevin S. MacKenzie REGISTRATION NO. 45,639 *(if appropriate)*

TELEPHONE (313) 965-8331 Docket Number: 19365-094676

USE ONLY FOR FILING A PROVISIONAL APPLICATION FOR PATENT

CERTIFICATE OF MAILING BY EXPRESS MAIL

EXPRESS MAIL LABEL NO. EL738855184US

I hereby certify that this paper (along with any paper referred to as being attached or enclosed) is being deposited with the United States Postal Service "Express Mail Post Office to Addressee" service under 37 C.F.R. 1.10 on **August 1, 2003**, and is addressed to: Mail Stop PROVISIONAL, Commissioner for Patents, P.O. Box 1450, Alexandria, VA 22313-1450.

By: Andrea Y. Downing
Andrea Y. Downing

Attorney Docket No. 19365-094676

3151965v2
0000/00000

VEHICLE SEAT ASSEMBLY AND FLOOR RAIL FOR LATERAL SEAT SHUTTLING

BACKGROUND OF THE INVENTION

Field of the Invention

The invention relates to a seat assembly for an automotive vehicle. More particularly, this invention relates to a riser assembly that allows the seat assembly to move laterally within the vehicle.

Description of the Related Art

Automotive vehicles include seat assemblies for supporting occupants within the vehicle. Seat assemblies include a seat cushion and a seat back operatively coupled to the seat cushion by a recliner mechanism for allowing selective pivotal adjustment of the seat back relative to the seat cushion between a plurality of reclined seating positions. Typically, the seat back is also movable between any one of the reclined seating positions and a generally horizontal, forwardly stowed position to present a load floor surface on the back of the seat back.

It is known in the automotive seating art to mount a riser assembly having a four bar linkage between the seat cushion and the floor of the vehicle for moving the seat assembly between a seating position with the seat cushion spaced above the floor of the vehicle and a forwardly stowed position with the seat cushion disposed generally forward of the seating position and lying against the floor of the vehicle. It is also known for such a riser assembly to allow movement of the seat assembly between the seating position and a stowed position. However, it remains desirable to have a riser assembly that allows movement of the seat assembly between the seating position and a stowed position that is laterally offset from the seating position.

SUMMARY OF THE INVENTION

According to one aspect of the invention, a riser assembly for connecting a seat to a floor of the vehicle is disclosed. The riser assembly includes a front rail attached to the floor of the vehicle. A rear rail is spaced from the front rail and is attached to the floor of the vehicle. A front latch is releasably engaged with the front rail from an engaged position to a partially engaged position. The rear latch is adapted to cinch about the rear rail from an engaged position to a partially engaged position. The front and rear latched are moveable laterally along the front and rear rails when in the partially engaged position.

BRIEF DESCRIPTION OF THE DRAWINGS

Advantages of the present invention will be readily appreciated as the same becomes better understood by reference to the following detailed description when considered in connection with the accompanying drawings wherein:

Figure 1 is a front perspective view of a seat cushion and a riser in a seating position;;

Figure 2 is a front perspective view of a seat cushion and a riser in a forwardly stowed position;

Figure 3 is a front perspective view of a seat cushion and a riser in a tumbled position;

Figure 4 is a partial side perspective view of the riser assembly;

Figure 5 is an enlarged perspective view of a front latch mechanism;

Figure 6 is an enlarged perspective view of a rear latch mechanism;

Figure 7 is a side view of the front and rear latches in a partially engaged position;

Figure 8 is a side view of an alternative embodiment of the riser assembly of the present invention;

Figure 9 is a side view of a second alternative embodiment of the riser assembly of the present invention.

DETAILED DESCRIPTION OF THE PREFERRED EMBODIMENT

Referring to Figure 1, a seat assembly for an automotive vehicle is generally indicated at 5. The seat assembly 5 includes a seat cushion 10 extending between an upper surface 14 for supporting an occupant above a floor 16 in the vehicle and an opposite bottom surface 18. A riser assembly 20 extends between the bottom surface 18 of the seat cushion 12 and the floor 16 of the vehicle. A track mechanism 19, as commonly known to those skilled in the art, is coupled between the bottom surface 18 and the riser assembly 20 for allowing selective forward and rearward adjustment of the seat cushion 12 relative to the riser assembly 20. The riser assembly 20 allows selective pivotal adjustment of the seat cushion 12 between a generally horizontal seating position as seen in Figure 1, a forwardly stowed position as seen in Figure 2, and a tumbled position as shown in Figure 3. The riser assembly 20 also allows lateral displacement of the seat assembly 10.

Referring to Figures 1 through 7, the riser assembly 20 includes first 24 and second 26 side members. The first 24 and second 26 side members are generally parallel to each other and spaced apart. Front 28 and rear 30 cross members join the first and second side members 24, 26, as best seen in Figure 3. Seat brackets 32 attached to the seat bottom 18 are connected to the track mechanism 19 which in turn is connected with the front and rear cross members 28, 30. As stated above, the track mechanism 19 and seat brackets 32 allow for adjustment of the seat cushion relative to the riser assembly 20 by an occupant of the vehicle.

The riser assembly 20 of the present invention includes front and rear rails 34, 36 attached to the floor 16 of a vehicle for engaging front 54 and rear latches 90, as will be

discussed in more detail below. The rails 34, 36 comprise a generally U-shaped member 42 having flanges 44 extending laterally away from the U-shaped section 42. As best seen in Figure 4, the flanges 44 have an arcuate shape with a bulbous portion 46 on the end portion of the flange 44 to securely engage a latch. The front and rear rails 34, 36 also include a filet 48 positioned on an upper portion 50 of the rail within the channel portion 52 of the U-shaped cross section 42.

Referring to Figure 5, there is shown the front latch mechanism 54 associated with the riser 20 of the present invention. The front latch mechanism 54 is pivotally connected to a front end 56 of the opposing side members 24, 26. The latch mechanism 54 is pivotally coupled to the side member 24 by a pin 58 allowing for pivotal movement of the latch mechanism 54. The front latch mechanism 54 comprises a pair of hook-shaped bodies 60 having a shank portion 62 terminating in a curved portion 64. The shank portion 62 of the hook-shaped bodies 60 include a slot 66 formed therethrough for receiving a pin 58 allowing pivotal scissor-like movement of the two hook-shaped bodies 60. As stated above, the latch mechanism 54 comprises two hook-shaped bodies 60 comprising a rear hook 66 and a forward hook 68 pivotally coupled in a scissor-like fashion. The rear hook body has a U-shaped cross section with a rearward hook portion 70 and a partial forward hook portion 72 for engaging the rear flange 44 and forward flange 44 of the front rail 34, respectively. As best seen in Figures 5 and 7, the rearward portion 70 of the rear hook 66 includes an isolator 78 attached to an inner surface of the curved portion 64. The isolator 78 retains the riser 20 to the front rail 34 and eliminates vibrations transmitted from the rail 34 to the latch mechanism 54. Preferably, the isolator 78 comprises a plastic material that reduces friction between the latch 54 and the rail 34 to provide for low efforts when the seat is moved in a lateral direction.

On a forward portion 72 of the rear hook 66, a slide 80 is attached along a relatively planar portion 82 of the central channel of the rear hook 66 for engagement with an upper surface 84 of the front flange 44 of the front rail 34. The slide 80 preferably comprises a plastic component that reduces friction between the latch 54 and rail 34 to provide for easy movement of the latch 54 when the seat is moved laterally along the rail 34. The front latch mechanism 54 also includes a front release bar 92 coupled to the rear hook member 66 of the front latch 54 for completely disengaging the front latch mechanism 54 from the front rail 34, as will be discussed in more detail below.

A biasing member 84 comprising a clock spring is attached to the pin 58 coupling the front latch 54 with the side member 24 and biases the front latch 54 into an engagement position with the front rail 34, as well as provides an assisting force when the seat is moved to a tumbled position, as will be discussed in more detail below. The front latch 54 also includes a gas strut 86 attached to a rear portion 70 of the rear hook 66 of the front latch 54 at one end and is connected to a rear reinforcement 88 of the rear latch mechanism 90 at another end. The gas strut provides a damping characteristic to the seat when in the tumbled position preventing sudden movement of the seat.

Referring to Figures 4 and 6, there is shown a rear latch mechanism 90 associated with the riser 20 of the present invention. The rear latch mechanism 90 includes a rear reinforcement 88 attached to the opposing side members 24, 26 in a rear portion 92 of the side members 24, 26. The rear reinforcement 88 provides structural stability to the latch mechanism 90, as well as provides a means for attaching the latch mechanism 90 to the side members 24, 26. The rear latch mechanism 90 comprises a pair of opposing hook-shaped bodies 94 having a shank portion 96 terminating in a curved portion 98. The shank portion 96 includes a slot 100 formed therethrough for pivotally engaging the rear reinforcement 88 by a bolt 102 received through the slot 100 and the rear reinforcement 88. As best seen in

Figure 6, the two hook-shaped bodies 94 comprise a forward hook body 104 and a rear hook body 106 spaced from each other and pivotally coupled to the rear reinforcement 88, as described above.

The rear reinforcement 88 includes first and second slots 108, 110 formed in a portion of the reinforcement 88 between the two hook shaped bodies 94 for providing a rear release mechanism. In the first slot 108, an orientation pin 112 is coupled to a release cam member 114. The release cam member 114 includes a triangular shaped body 116 having cam surfaces 118 for engaging corresponding cam surfaces 120 formed on the shank portion 96 of the two opposing hook-shaped bodies 94. The second slot 110 formed in the rear reinforcement 88 receives a pin 122 for engaging a release link 124 coupled to a rear release handle 126, as well as a connecting link 128 connected at one end to the rear latch mechanism 90 and another end to the front latch mechanism 54 for unifying movement of both the front and rear latch mechanisms 54, 90 from an engagement position to a partial engaging position allowing movement of the latches 54, 90 laterally along the front and rear rails 34, 36.

As stated above, a rear release handle 126 is connected to the release link 124. The release link 124 includes a slot 130 for receiving the pin 122 that projects from the second slot 110 of the rear reinforcement 88 through the cam release member 114 and into the slot 130 formed on the rear release link 124, as well as through a slot 132 formed on the connecting link 128 connecting the front and rear latches 54, 90. Movement of the rear latch handle 126 corresponds to pivotal movement of the rear latch link 124 causing the pin 122 to be moved resulting in vertical movement of the cam release member 114 causing the hook-shaped bodies 94 to be moved from engagement positions with the rail 36 to partially and fully disengaged positions from the rail 36. Movement of the pin 122 also corresponds to movement of the connecting link member 128 resulting in corresponding partial

disengagement of the front latch mechanism 54 concurrently with a partial disengagement of the rear latch mechanism 90, allowing movement of the seat laterally along the rails 34, 36.

The opposing rear hook shaped bodies 94 preferably include an anti-rattle feature 132 comprising a plastic component attached along an inner surface of the hook shaped bodies 94 to dampen vibrations between the hook shaped bodies 94 and the flange portions 44 of the rear rail 36.

Referring to Figure 7, the rear latch mechanism 90 includes front and rear slides 134 positioned on a lower surface 136 of the rear reinforcement 88, corresponding to an upper surface 138 of the front and rear flanges 44 of the rear rail 36. As with the slides 80 associated with the front latch 54, the rear slides 134 preferably comprise a plastic material resulting in a reduced friction between the latch 90 and rail 36 resulting in easier lateral movement of the latch 90 along the rail 36. In a preferred aspect of the present invention, the rear latches 90, as with the front latches 54 , are spring biased into engagement with the front and rear rails 34, 36 such that corresponding movement of the rear release handle 126 is required to disengage the hook shaped bodies 94 of the rear latch 90from the front and rear flanges 44 of the rear rail 36.

In operation, when the seat is either in the seat occupying orientation shown in Figure 1, or the folded position shown in Figure 2, the rear latch handle 126 may be actuated transmitting movement through the rear latch link 124 to the pin 122 through the rear reinforcement 88 causing movement of the releaser cam member 114, thus partially disengaging the opposing hook shaped bodies 94 of the rear latch mechanism 90, as best seen in Figure 7. Corresponding movement of the pin 122 associated with the release cam member 114 and rear latch link 124 causes movement of the connecting link member 128 by engagement of the pin 122 within the slot 132 formed in a rear portion of the connecting link member 128. The connecting link member 128 is connected to a front hook 68 of the front

latch mechanism 54. Therefore, movement of the connecting link member 128 causes movement of the front hook 68 of the front latch mechanism 54, resulting in a partial disengagement of the front latch 54 from the front rail 34. With the front and rear latch mechanisms 54, 90 partially disengaged from the rails 34, 36, the seat is free to travel along the rails 34, 36 in a lateral direction. The slides 80, 134 associated with the front 54 and rear 90 latch mechanisms provide a reduced friction between the latch mechanisms 54, 90 and the rails 34, 36 resulting in easy movement of the seat in a lateral direction.

When the seat is folded in the stowed position shown in Figure 2, the rear release handle 126 may be further actuated beyond the first position resulting in partial disengagement of the rear latch 90, to a second position completely disengaging the rear latch 90 from the rear rail 36, resulting in the tumbled position of the seat, as seen in Figure 3. When the seat is in the tumbled position, the gas strut 86 extending from the rear reinforcement 88 to the rear hook 68 of the front latch 54 extends; thereby dampening the movement of the riser assembly 20 between the tumbled and seated positions. After release of the rear latch mechanisms 90 from the rear rail 36, the front latch mechanism 54 remains in the engaged position with the front rail 34 allowing for the tumbled position shown in Figure 3.

Should an operator wish to completely remove the seat from the front rail 34, the front release handle 92 is actuated overcoming the spring biasing force of the front latch mechanism 54 that maintains the front latch 54 into engagement with the front rail 34, as well as provides a biasing force for assisting in raising the riser 20 from the seated to the tumbled position. Once the front handle 92 is completely depressed, the seat may be removed by tilting it away from a front flange 44 of the front rail 34 allowing for complete removal of the seat from the front rail 34. It is a characteristic of the present invention that the seat can be removed from any lateral position along the front rail 34.

To reinstall the seat, the front latch 54 is positioned in the forward folded position as shown in Figure 2 with out being attached to the rails 34, 36; the front latch 54 is then moved forward until the rear hook portion 66 is engaged with the rear flange 44 of the front rail 34. The seat may then be rotated upward and forward about the rear hook 66 until the front latch 54 is engaged with the front rail 34. The seat is now in the tumbled position shown in Figure 3. To complete the installation of the seat, the seat may be rotated downward and rearward until the rear latches 90 are engaged with the rear rail 36. The seat is now in the position shown in Figure 2. The recliner handle may next be rotated to return the seat back to an upright lock position allowing the seat cushion to return to the design position allowing for use by an occupant of a vehicle.

Referring to Figure 8, there is shown a first alternative embodiment of the riser 20 of the present invention. The front latch mechanism 200 allows for tumbling and shuttling of the seat but is not removable, as with the previously described embodiment. The front latch mechanism 200 of the alternative embodiment comprises a unified structure 205 having corresponding hook-shaped portions 210 for engaging the flange surfaces 44 of the front rail 34. They are not pivotally coupled to the side members 24, 26 allowing scissor-like movement, as previously described with the first embodiment. The rear latch mechanism 90 is the same as that described previously with reference to the first embodiment.

Referring to Figure 9, there is shown a second alternative embodiment in which the front latch mechanism 300 allows for the riser 20 to shuttle laterally and be removed from the front rail 34, but does not tumble as described with the previous first embodiment. As can be seen in Figure 9, a rear latch mechanism 90 is the same as that disclosed in the previous first embodiment. However, the front latch mechanism 300 comprises a hook-shaped slot 305 that engages a bulbous portion 310 of a flange 44 extending from a front rail 34. In this design, there is no pivotal connection with the side members 24, 26 allowing for the tumbling

of the seat, as previously described with respect to the first embodiment. However, the rear latch mechanism 90 is capable of partial disengagement, as previously described, allowing for lateral shuttling of the seat along a front 34 and rear 36 rail.

The invention has been described in an illustrative manner, and is to be understood that the terminology which has been used is intended to be in the nature of words of description rather than limitation. Many modifications and variations of the present invention are possible in light of the above teachings. It is therefore to be understood that within the scope of the appended claims, the invention may be practiced other than as specifically described.

What is claimed is:

1. A riser assembly for connecting a seat to a floor of a vehicle, the riser assembly comprising:

a front rail attached to the floor of the vehicle;

a rear rail spaced from the front rail and attached to the floor of the vehicle;

a front latch releasably engageable with the front rail from an engaged position to a partially engaged position;

a rear latch releasably engageable with the rear rail from an engaged position to a partially engaged position;

the front and rear latches moveable laterally along the front and rear rails when in the partially engaged position.

2. A riser assembly as set forth in claim 1 wherein the front latch comprises a pair of hook members adapted to cinch about the front rail.

ABSTRACT

A riser assembly for connecting a seat to a floor of the vehicle is disclosed. The riser assembly includes a front rail attached to the floor of the vehicle. A rear rail is spaced from the front rail and is attached to the floor of the vehicle. A front latch is releasably engaged with the front rail from an engaged position to a partially engaged position. The rear latch is adapted to cinch about the rear rail from an engaged position to a partially engaged position. The front and rear latched are moveable laterally along the front and rear rails when in the partially engaged position.

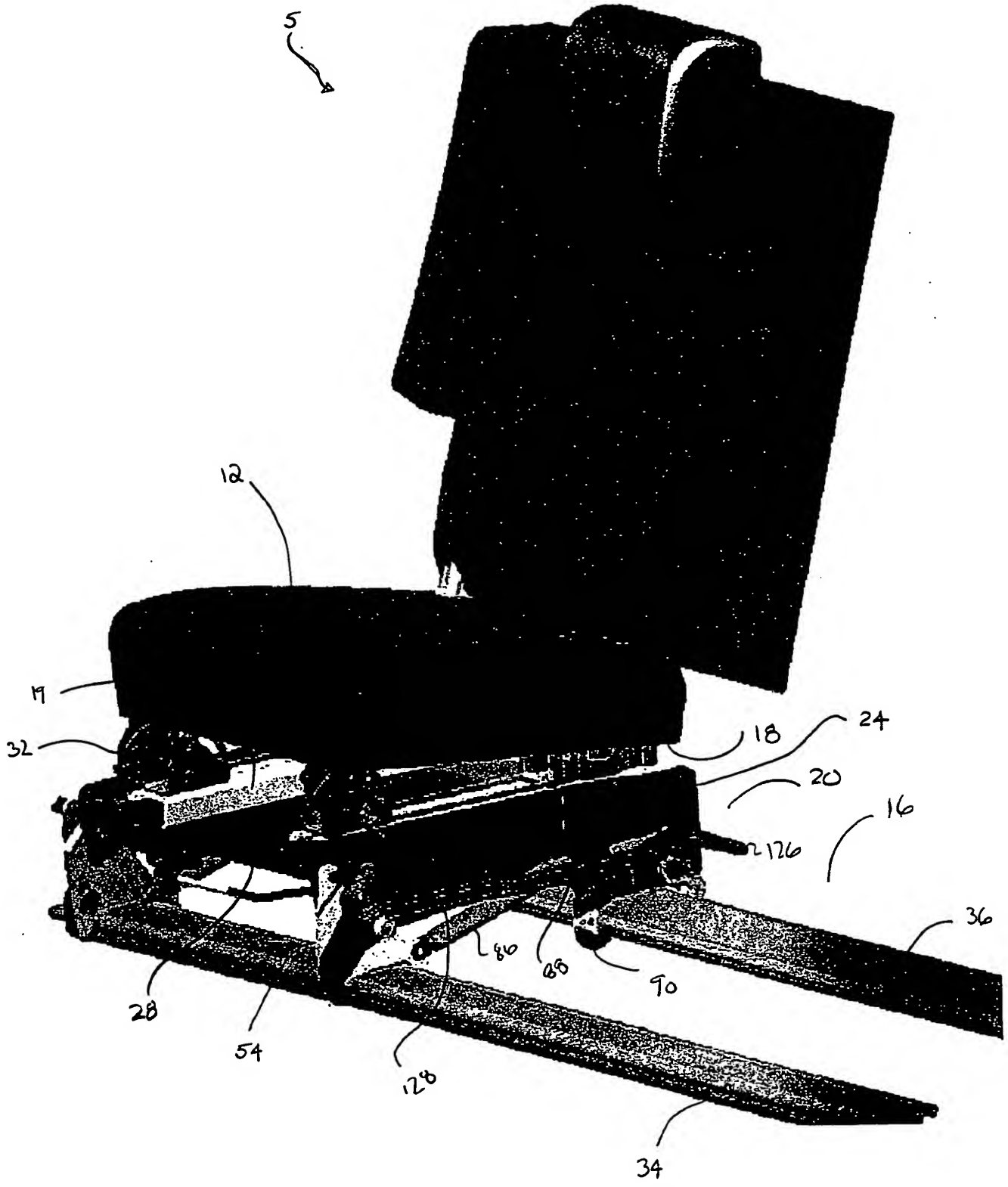
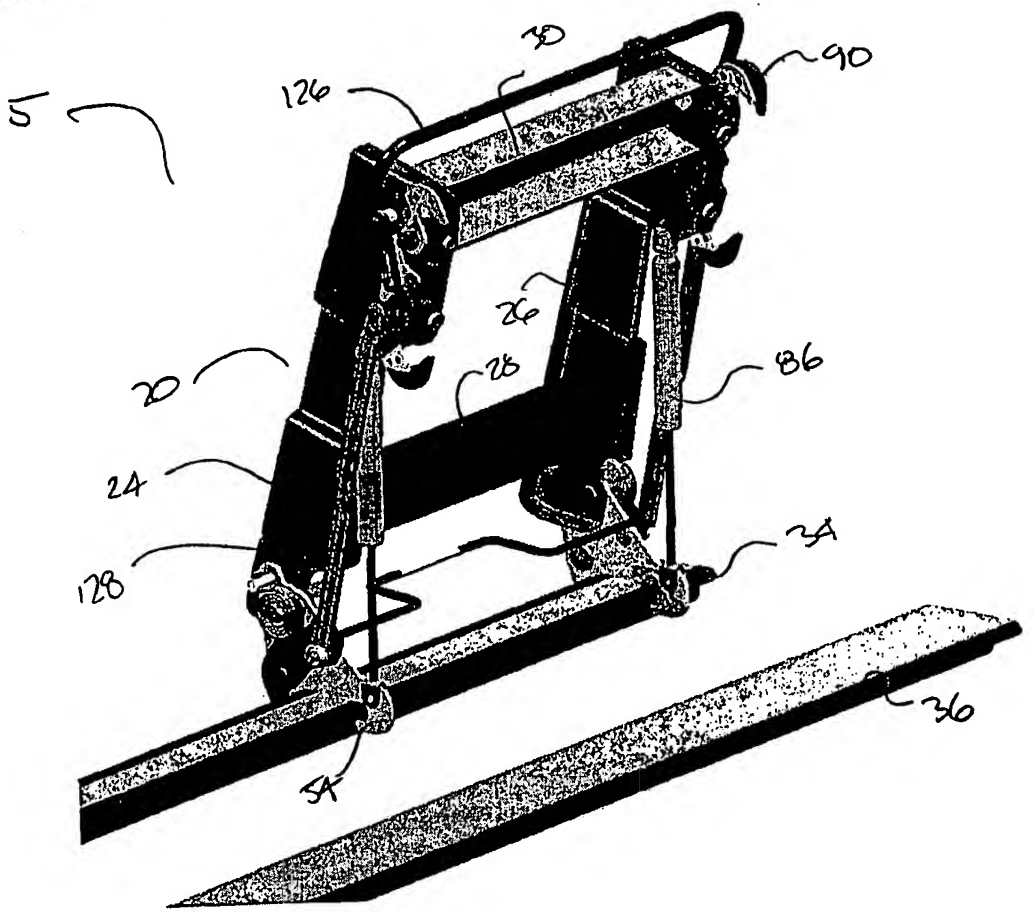


FIGURE 1



Risers in the Fold & Tumble Position

FIGURE 3

PATENT PENDING

INTIER Automotive

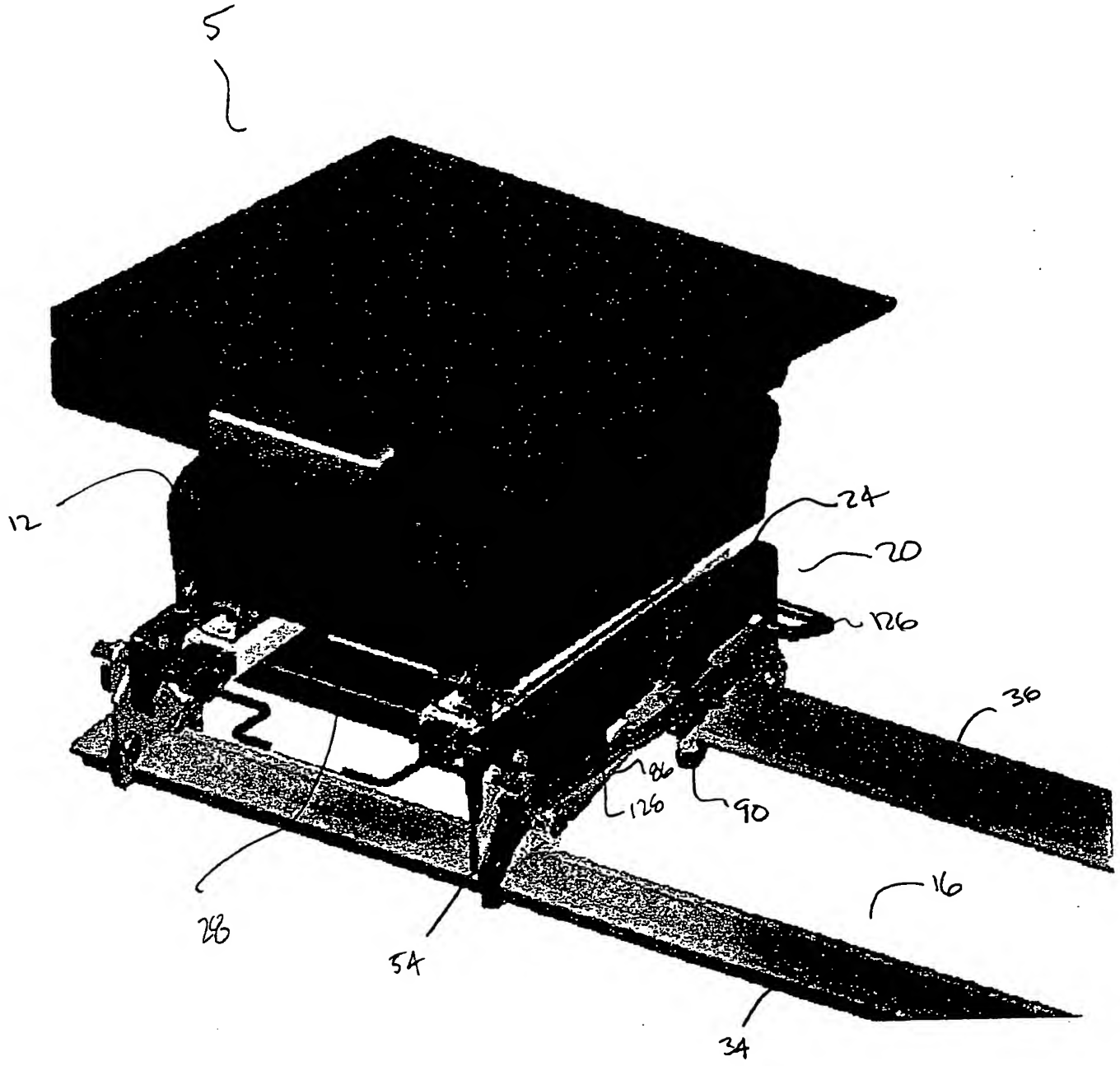


FIGURE 2

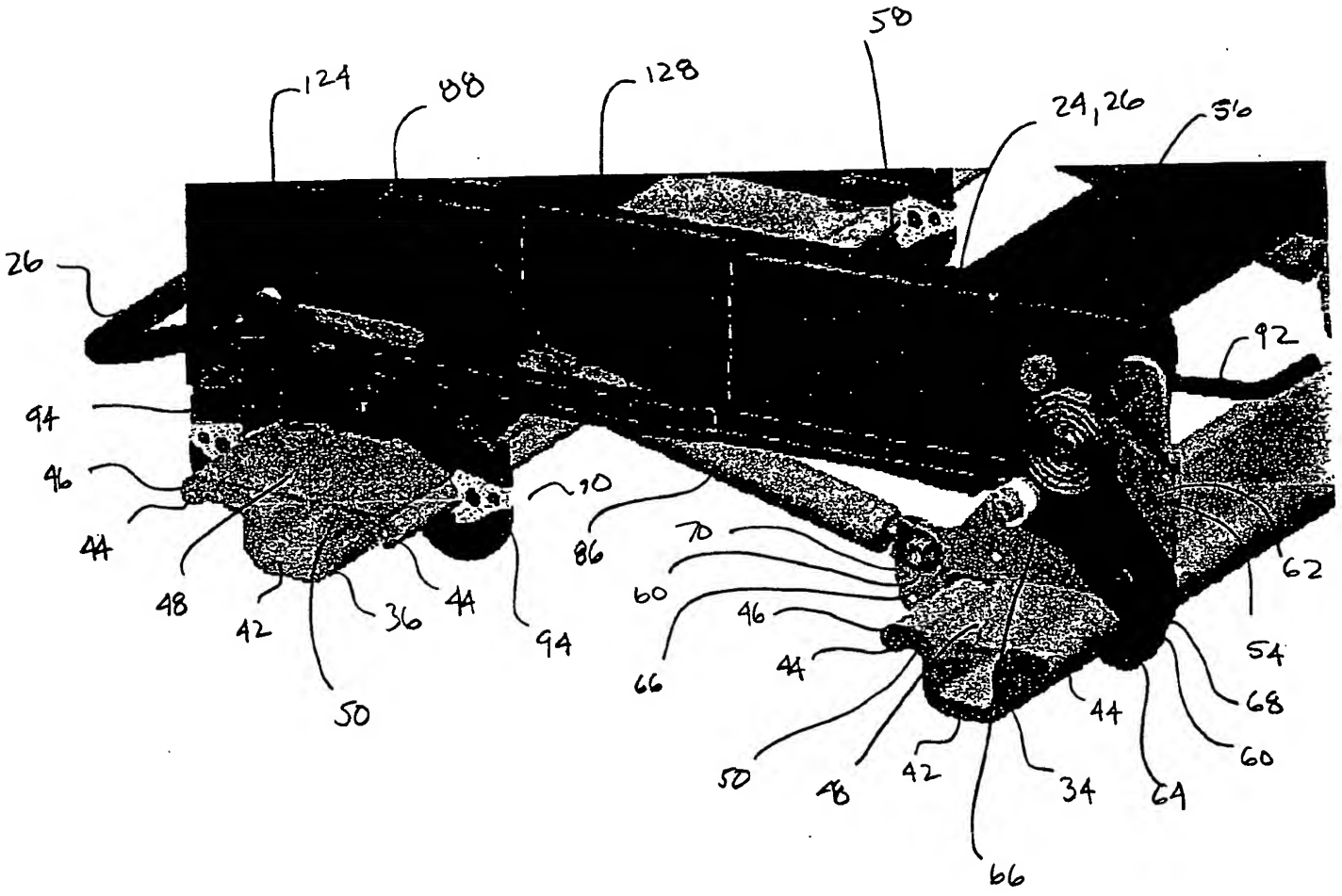

124
88
128
58
24, 26
56
26
92
94
96
44
48
42
36
44
94
50
86
70
60
46
44
66
50
48
42
34
64
66
44
54
68
60
62

FIGURE 4

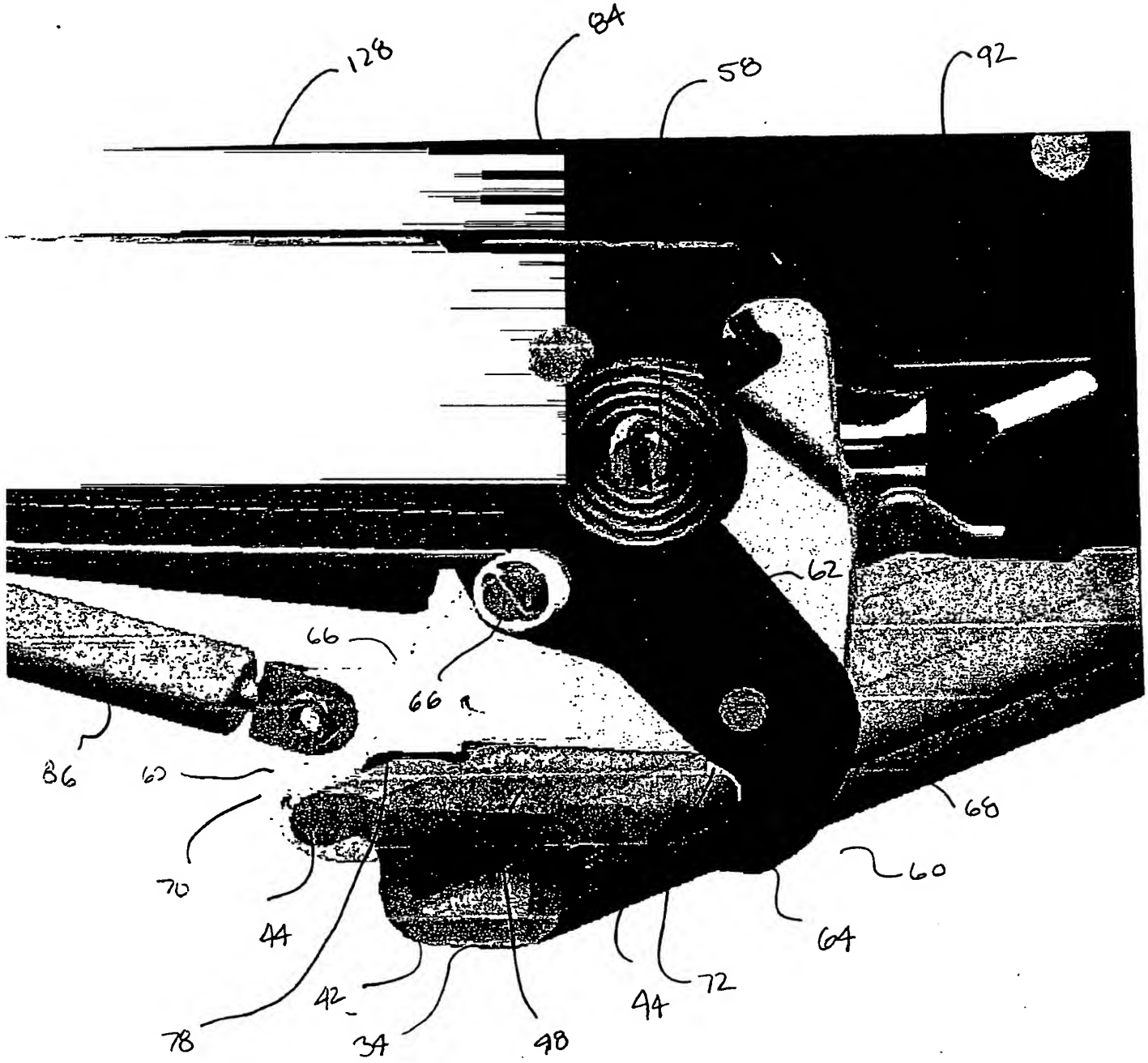


FIGURE 5

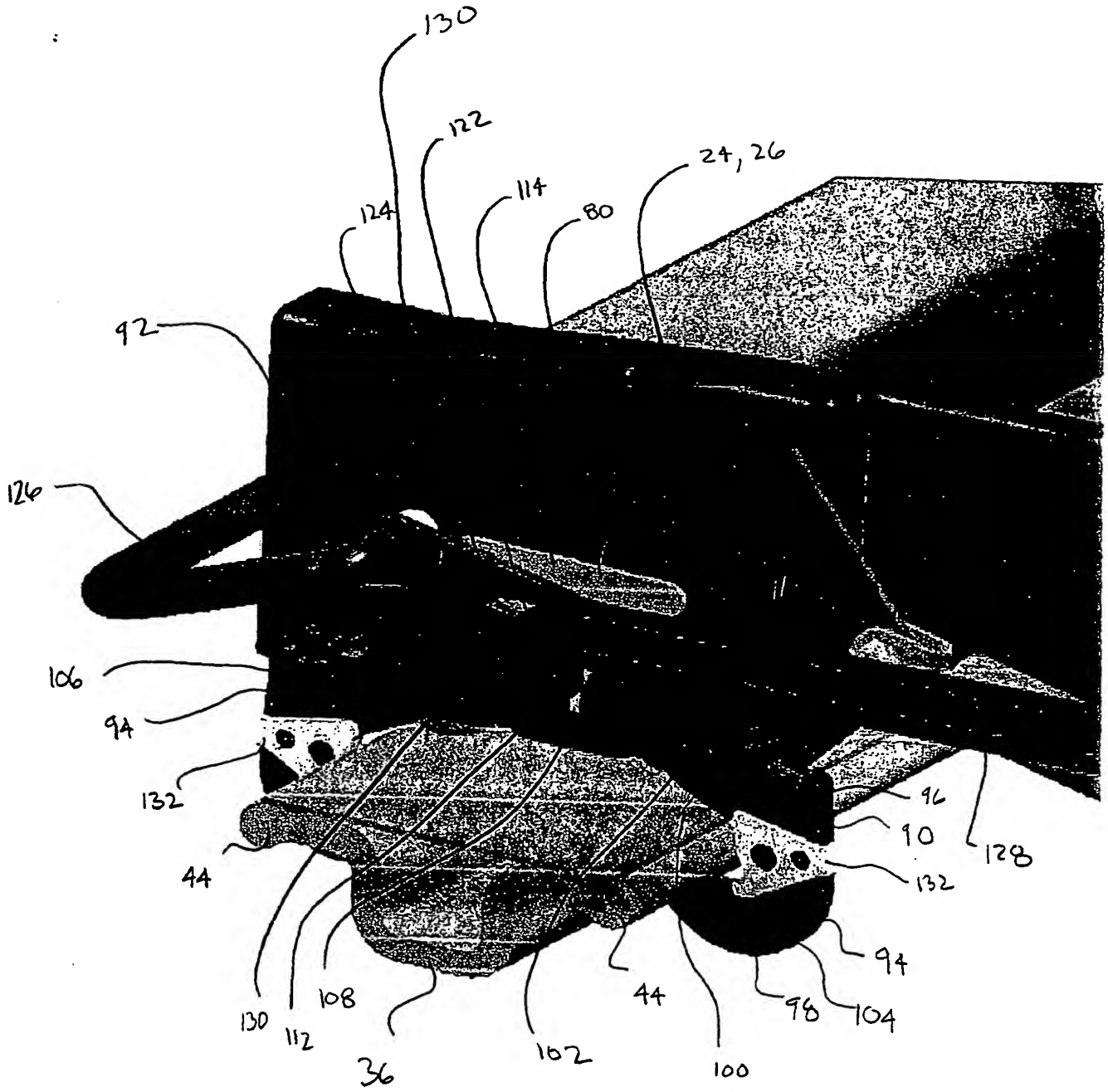
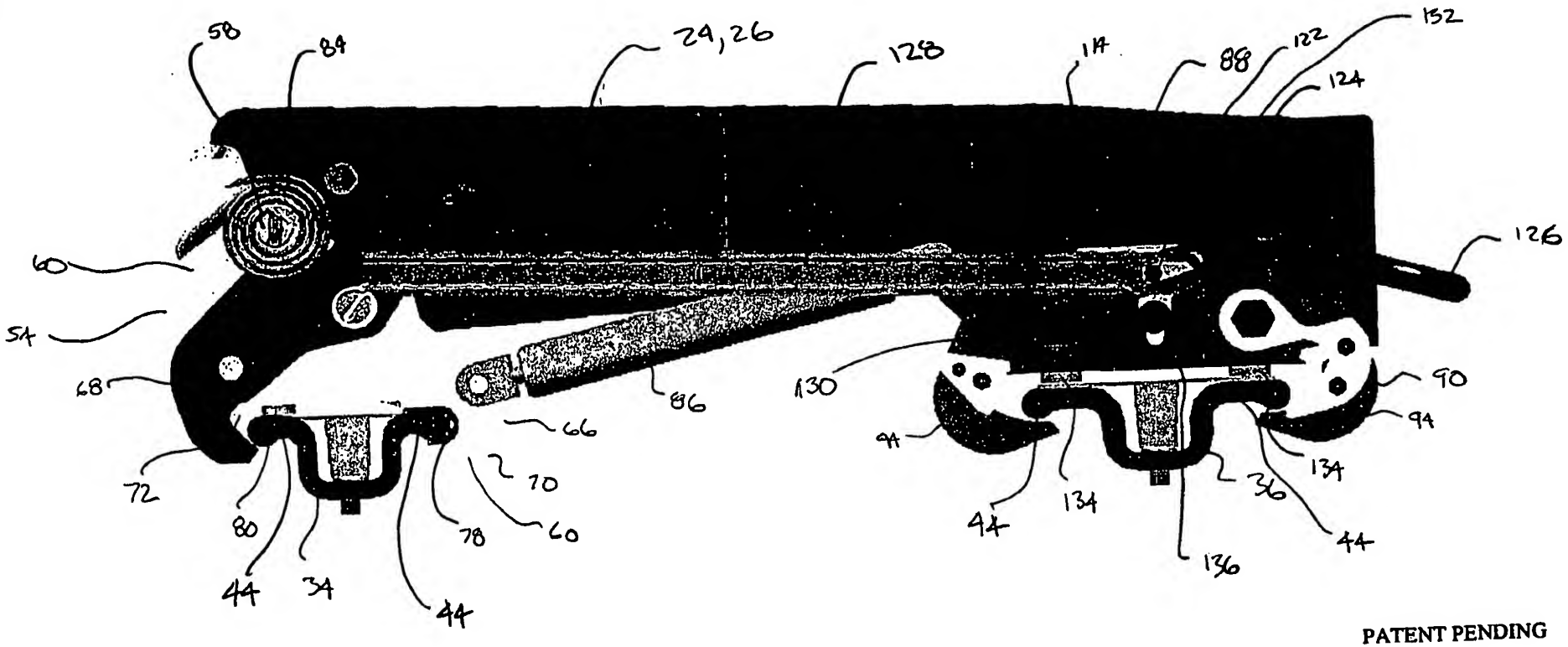

130
122
124
114
80
24, 26
92
126
106
94
132
44
130
112
108
36
102
44
100
98
104
94
132
90
96
128

FIGURE 6

2nd Row Easy Entry



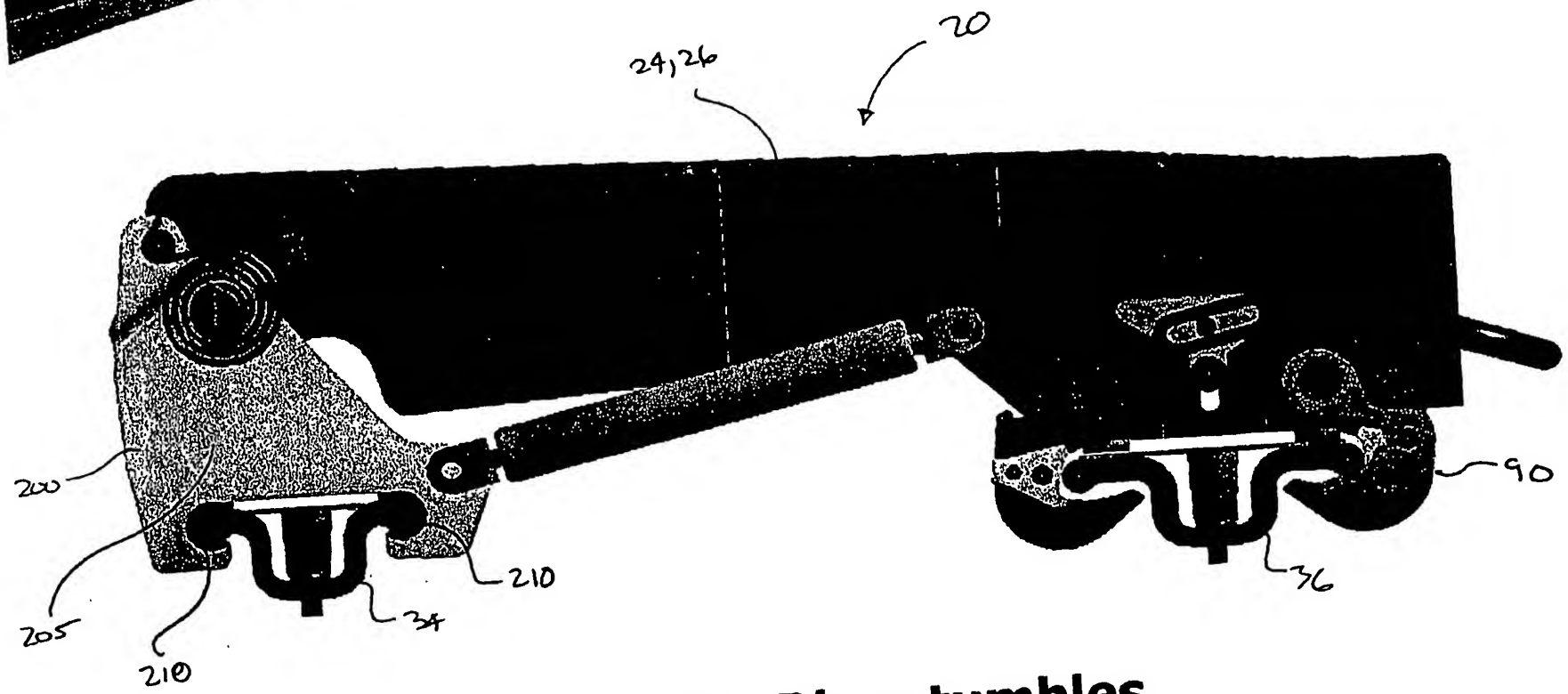
PATENT PENDING

Risers in the Shuttle Position

INTIER Automotive

FIGURE 7

2nd Row Easy Entry



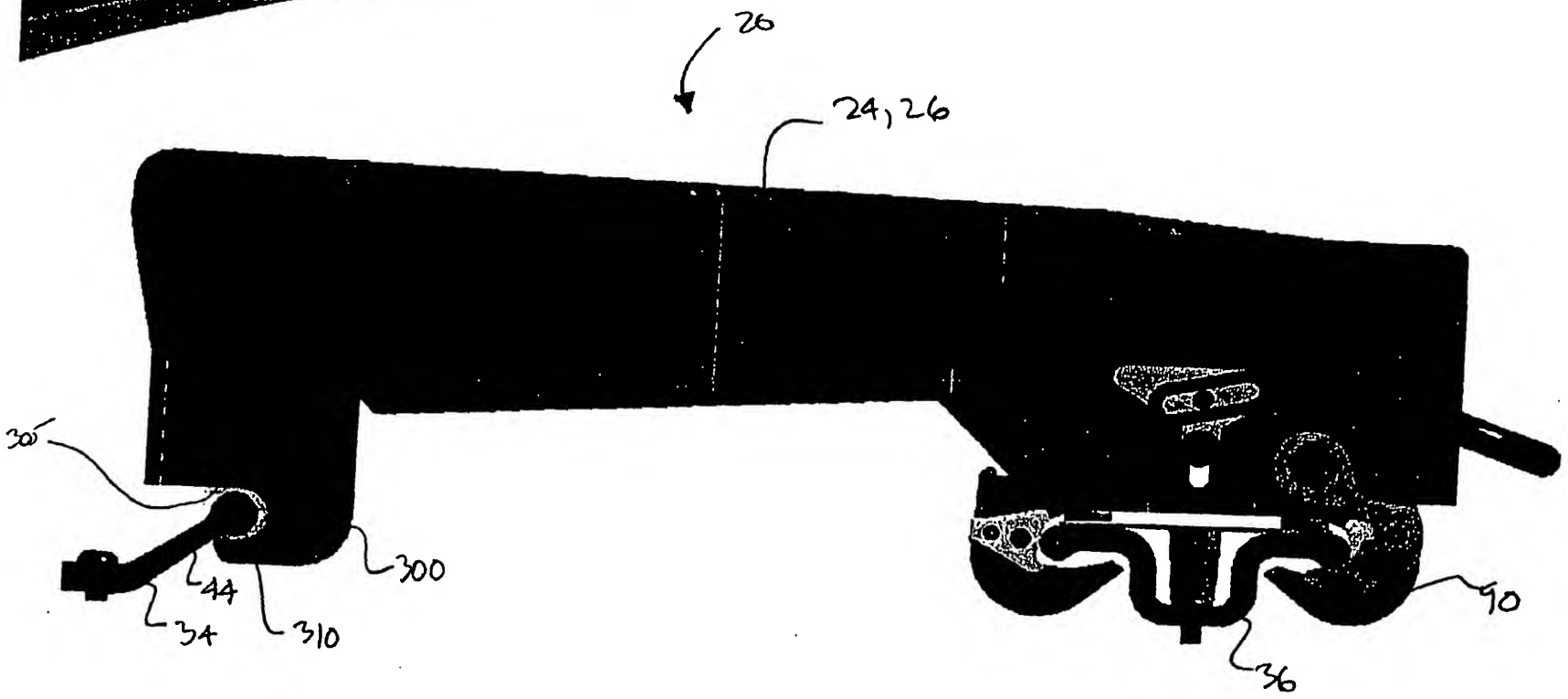
OPTIONAL DESIGN: Riser tumbles and shuttles, but is not removable

PATENT PENDING

INTIER Automotiv

FIGURE 8

2nd Row Easy Entry



OPTIONAL DESIGN: Riser shuttles and is removable, but does not tumble

PATENT PENDING

INTIER Automotiv

FIGURE 9

Document made available under the Patent Cooperation Treaty (PCT)

International application number: PCT/US2004/024993

International filing date: 02 August 2004 (02.08.2004)

Document type: Certified copy of priority document

Document details: Country/Office: US
Number: 60/491,887
Filing date: 01 August 2003 (01.08.2003)

Date of receipt at the International Bureau: 10 September 2004 (10.09.2004)

Remark: Priority document submitted or transmitted to the International Bureau in compliance with Rule 17.1(a) or (b)

World Intellectual Property Organization (WIPO) - Geneva, Switzerland
Organisation Mondiale de la Propriété Intellectuelle (OMPI) - Genève, Suisse